We claim:

1. A continuous process for isolating butenes from a C_4 fraction comprising butanes, butenes and possibly traces of other hydrocarbons by extractive distillation using a selective solvent (LM), in which

the C_4 fraction is, in a first process stage I, separated in a scrubbing zone (E) into which the C_4 fraction (C_4) is fed in gaseous or liquid form and the selective solvent (LM) is fed in liquid form above the feed point of the C_4 fraction into a butane-containing top stream (C_4H_{10}) and a bottom stream (LM/C_4H_8) comprising the selective solvent laden with the butenes and possibly traces of other hydrocarbons, and the bottom stream (LM/C_4H_8) is,

in a second process stage II, separated in a degassing zone (A) to which energy is fed via a bottom vaporizer (W5) and which is at a higher temperature and/or lower pressure than the scrubbing zone (E) into a top stream (C_4H_8) comprising the butenes and any traces of other hydrocarbons and a bottom stream (LM) comprising the selective solvent, with the heat of the bottom stream (LM) from the degassing zone (A) being utilized for increasing the temperature in the degassing zone (A),

wherein the liquid or a substream of the liquid is taken off from the degassing zone (A) at a theoretical plate located one or more theoretical plates below the feed point for the bottom stream (LM/C_4H_8) from the scrubbing zone (E), heated and/or vaporized by indirect heat exchange with the hot bottom stream (LM) from the degassing zone (A) and returned to the degassing zone (A) at the same theoretical plate or above this, with the theoretical plate from which the liquid or substream of liquid is taken off being selected so that the total energy requirement in the process stages I and II is minimized.

2. A process as claimed in claim 1, wherein the C_4 fraction (C_4) is fed to the scrubbing zone (E) in gaseous form, preferably in the lower part thereof.

3. A process as claimed in claim 1 or 2, wherein the liquid or a substream of the liquid is taken off from the scrubbing zone (E) from a theoretical plate located one or more theoretical plates below the feed point for the stream of selective solvent (LM), preferably below the feed point for the C_4 fraction (C_4), heated and/or vaporized by indirect heat exchange with the hot bottom stream (LM) from the degassing zone (A) and returned to the scrubbing zone (E) at the same theoretical plate or above this, with the theoretical plate from which the liquid or substream of liquid is taken off being selected so that the total energy requirement in the process stages I and II is minimized.

4. A process as claimed in any of claims 1 to 3, wherein the selective solvent used consists of one or more of the substances N-methylpyrrolidone (NMP), dimethylformamide, acetonitrile and furfural or a mixture of one or more of the abovementioned substances with cosolvents.

5. A process as claimed in claim 4, wherein NMP containing from 0 to 20% by weight of water, in particular from 7 to 10% by weight of water, particularly preferably 8.3% by weight of water, is used.

6. A process as claimed in any of claims 1 to 5, wherein the liquid or the substream of the liquid from the degassing zone (A) and/or from the scrubbing zone (E) is returned to the same theoretical plate from which the liquid or the substream of the liquid was taken off.

7. A process as claimed in any of claims 1 to 6, wherein the liquid stream or substream taken off is subjected to expansion evaporation to give a gaseous phase and a liquid phase and the gaseous and liquid phases are subsequently returned to the same theoretical plate from which the liquid stream or substream was taken off or the gaseous part of the liquid stream or substream which was taken off is returned to a theoretical plate located one or more theoretical plates above the theoretical plate from which the liquid stream or substream was taken off.

8. A process as claimed in any of claims 1 to 7, wherein the number of theoretical plates in the scrubbing zone (E) is from 10 to 80, preferably

from 20 to 30, in particular 26, and the number of theoretical plates in the degassing zone (A) is from 1 to 30, preferably from 2 to 8, in particular 4.

9. A process as claimed in any of claims 1 to 8, wherein the scrubbing zone (E) and the degassing zone (A) are both located in a single column.